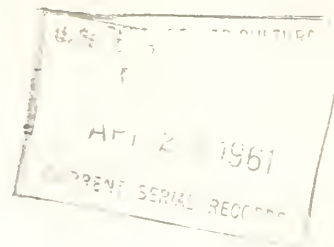


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Effectiveness of a
special promotional
campaign for

FROZEN CONCENTRATED ORANGE JUICE

Marketing Research Report No. 457

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Market Development Research Division



Growth Through Agricultural Progress



PREFACE

This report summarizes findings of a study of sales response to a special promotional campaign for frozen concentrated orange juice. The study is one of a group conducted by the U. S. Department of Agriculture to evaluate the impact of commodity promotional programs, as an aid to agricultural commodity groups in planning more efficient programs. Two research techniques were used in this study: Regression analysis and analysis of purchasers by family characteristics. This study is part of the Department's broad program of research designed to improve marketing and to expand markets for farm commodities.

Data upon which this study is based were developed, under contract, by the Market Research Corporation of America, with the Department and the Florida Citrus Commission sharing the contract cost.

Washington, D. C.

March 1961



EFFECTIVENESS OF A SPECIAL PROMOTIONAL CAMPAIGN
FOR FROZEN CONCENTRATED ORANGE JUICE

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SUMMARY

A nationwide promotional campaign was carried on by 22 cooperating producers of Florida frozen orange concentrate in the latter part of 1959, as a means of dealing with excess stocks. The objective was to increase the volume of purchases by concentrate users and to attract new users.

The special promotional effort resulted in significantly higher sales during the active promotion months of September through November, and in the post-promotion months December through March. Monthly sales during this 7-month period were about 13 percent higher than would be expected without a promotional effort.

Assuming the same relationship of sales to prices for frozen orange concentrate that existed for 3 years preceding the promotion, a reduction of approximately 2.4 cents per 6-ounce can in the monthly average price would have been necessary to obtain the sales volume that was obtained. A price reduction of this magnitude would have amounted to a reduction in gross sales revenue of approximately \$18 million during this period; or, stated another way, the gross sales revenue actually received for the same volume of juice is estimated as \$18 million greater than would have occurred without promotion.

A special analysis of buyers of frozen concentrated orange juice showed that the sales increases were obtained from two sources. The proportion of the Nation's families buying the product increased, along with an increase in the average size of family purchase, as compared with periods of no promotion.

Total expenditures by the cooperating processors amounted to about \$4 million, which paid for media advertising, consumer and dealer contests, and consumer coupons in newspapers and magazines. The Florida Citrus Commission cooperated by providing intensified dealer-service and public relations activities. The contests and coupons were offered during September, October, and November 1959, and coupons were redeemed through February 1960.

The elasticity of demand for frozen concentrated orange juice for 3 years prior to the promotional program was approximately -1.0; that is, changes in volume purchased were inversely proportional to changes in price. From September 1959 through March 1960, the coefficient of elasticity of demand was the

same as in the previous 3 years, but at a significantly higher level of purchases. Thus, a positive shift occurred in the demand. Beneficial effects of the promotional campaign continued, but at a diminishing rate, from March through July 1960. During April, sales decreased, but were still somewhat above the expected level without promotion. Thereafter, the sales level declined steadily at a constant rate to August, when sales were approximately in the same relationship to price as they were before the promotion.

Approximately 10 percent of the families buying frozen orange concentrate during the promotion period (September-November) used one or more 12-cent coupons in making purchases. However, the volume of purchases represented by the use of coupons was only 4.4 percent of the total quantity purchased during this period.

INTRODUCTION

Stocks of Florida frozen concentrated orange juice reached a record level in the summer of 1959 (fig. 1). August stocks of frozen concentrate were 31 percent higher than the 5-year average for the month and 61 percent greater than holdings of the previous August. The excess inventories resulted from much higher yields of juice than expected from the 1958-59 orange crop and an insufficient movement into consumption to dispose of the added production. In addition to the record inventory holdings, a new production record for oranges appeared probable in the major concentration area.

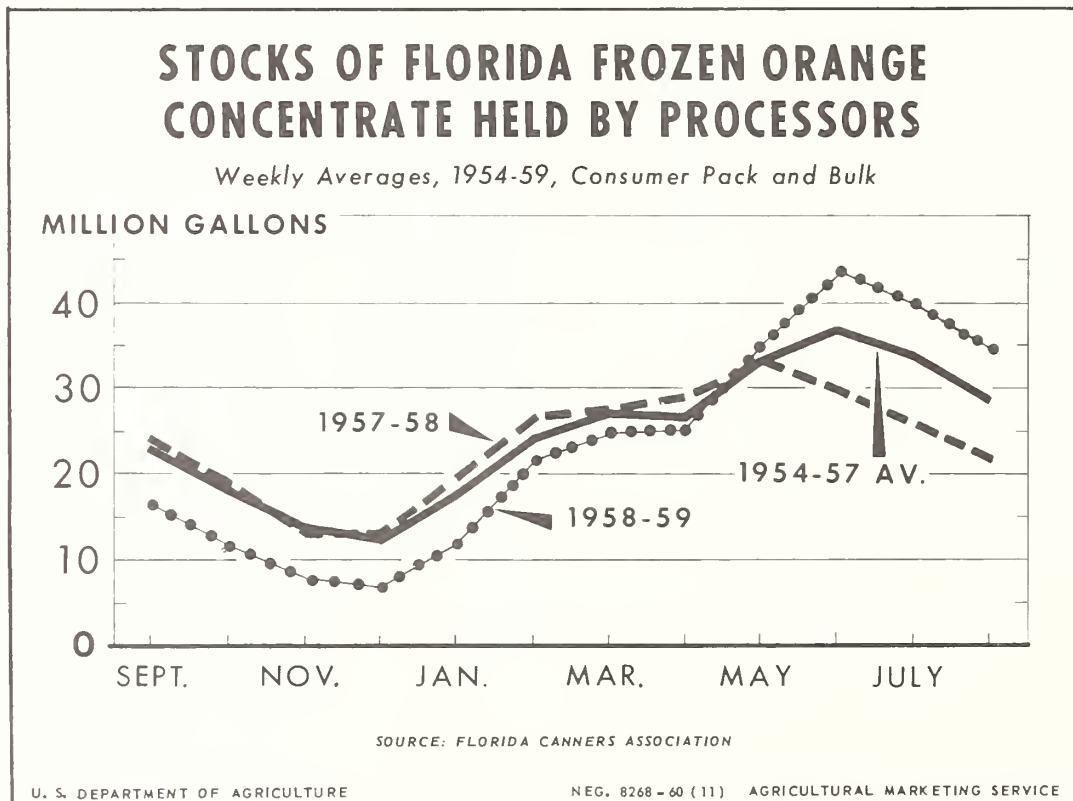


Figure 1

The severe freeze damage to bearing trees in 1957-58 resulted in reduced production which led to higher retail prices for frozen orange concentrate and favored competitive products. A full recovery of production of bearing trees to the prefreeze level was anticipated by the 1960-61 season, and in addition 140,000 acres of young citrus trees were expected to come into production during the following 5 years. Thus, the citrus industry was faced with the problems of regaining markets lost to competing fruits and other products, and of expanding the demand for citrus products so that production from the additional acreage could be marketed at prices providing reasonable returns to growers, shippers, and processors.

Industry leaders felt that some action should be taken to increase the movement of frozen concentrate into consumption. Action was deemed necessary to prevent a chaotic market condition resulting from a burdensome carryover of stocks and the anticipated added production.

Twenty-two producers of Florida frozen orange concentrate initially contributed \$3.3 million for a special promotion, and the Florida Citrus Commission cooperated by intensifying its merchandising program. The funds contributed by concentrators were used to finance media advertising, consumer and dealer contests, and the issuance and redemption of coupons. 1/ An estimated 106 million 12-cent coupons and 74 million 20-cent coupons were printed in newspapers and magazines through the Nation during September, October, November, and early December 1959. 2/

The 12-cent coupons were redeemed by retailers on the purchase of four 6-ounce cans or two 12-ounce cans of frozen orange concentrate. The 20-cent coupons were redeemed in cash by a redemption agency upon receipt of the coupon and can tops from four 6-ounce cans or two 12-ounce cans.

FINDINGS

To determine the sales effectiveness of the promotional program, it was necessary to estimate closely the volume of frozen orange concentrate that would have been purchased during the period studied without the promotional effort. An analysis was made of monthly sales and prices of frozen concentrated orange juice and other selected juices and ades from August 1954 through August 1959 to identify significant relationships between the volume of frozen orange concentrate purchased and the price and sales of other juices and ades. 3/

Findings of this analysis showed that change in the price of frozen orange concentrate was the only factor studied that was significantly related to changes in sales during that period. Ninety-two percent of the variation in purchases

1/ Due to a higher rate of coupon redemption than anticipated, the total cost of the program to the concentrate producers was approximately \$3.9 million.

2/ Estimates based on circulation of newspapers and magazines in which advertisements with coupons appeared; 20-cent coupons were made available also in stores not included in estimates.

3/ Prices used in the analysis were the average monthly retail prices paid by consumers for frozen concentrated orange juice and other juices and ades.

of frozen orange concentrate was directly associated with variation in price. Approximately 6 percent of the change in purchases was associated with year-to-year shifts in the purchase level. These year-to-year shifts were apparently associated with such factors as population growth, increases in personal income, and consumer reaction to the freeze-damaged crop of 1957-58. Thus, the prediction equations were based on the relation of sales to prices during the 3 years previous to the promotion, since that relationship was relatively stable during this period.

The coefficient of elasticity of demand for the relationship of sales to prices was -1.0, indicating that the change in quantity purchased is equal percentage-wise to the accompanying change in price. ^{4/} For example, between September 1959 and March 1960, the average price of frozen concentrated orange juice decreased from 22.1 cents to 18.0 cents per 6-ounce can, or 18.6 percent; during the same period, the expected sales increase without promotion would have been from 4,050,000 gallons to 4,975,000 gallons.

There were no apparent variations in purchases associated with seasonal trends after adjustments were made for differences in price. The analysis did not show any significant relationship between the quantity of frozen orange concentrate sales and the price of other juices and ades which were thought to be competitive. However, the prices of these juices were highly correlated with the price of frozen orange concentrate. Therefore, it cannot be inferred that variations in the price of these juices relative to the price of frozen orange concentrate would not affect sales of orange concentrate. In fact, it is likely that substantial shifts in the price of other juices and ades relative to the price of frozen orange concentrate would affect the volume of orange concentrate purchased, since the uses are comparable. A logical conclusion from the high degree of correlation between prices and sales of the various juices is that a high degree of competition existed between these juices, and that the citrus juices compete with each other for supplies of fresh fruit from which they are produced.

The relationship between the price and purchases of frozen orange concentrate was determined and used to predict sales during the promotion period, September-November 1959, and the immediate postpromotion period, December 1959 through August 1960, for various prices. Actual purchases were then compared to predicted or expected sales without promotion (fig. 2). During this period, actual sales were approximately 13 percent greater than the predicted sales. As shown in the chart, sales during the promotion period and through March of the postpromotion period were well above the level that would have been expected

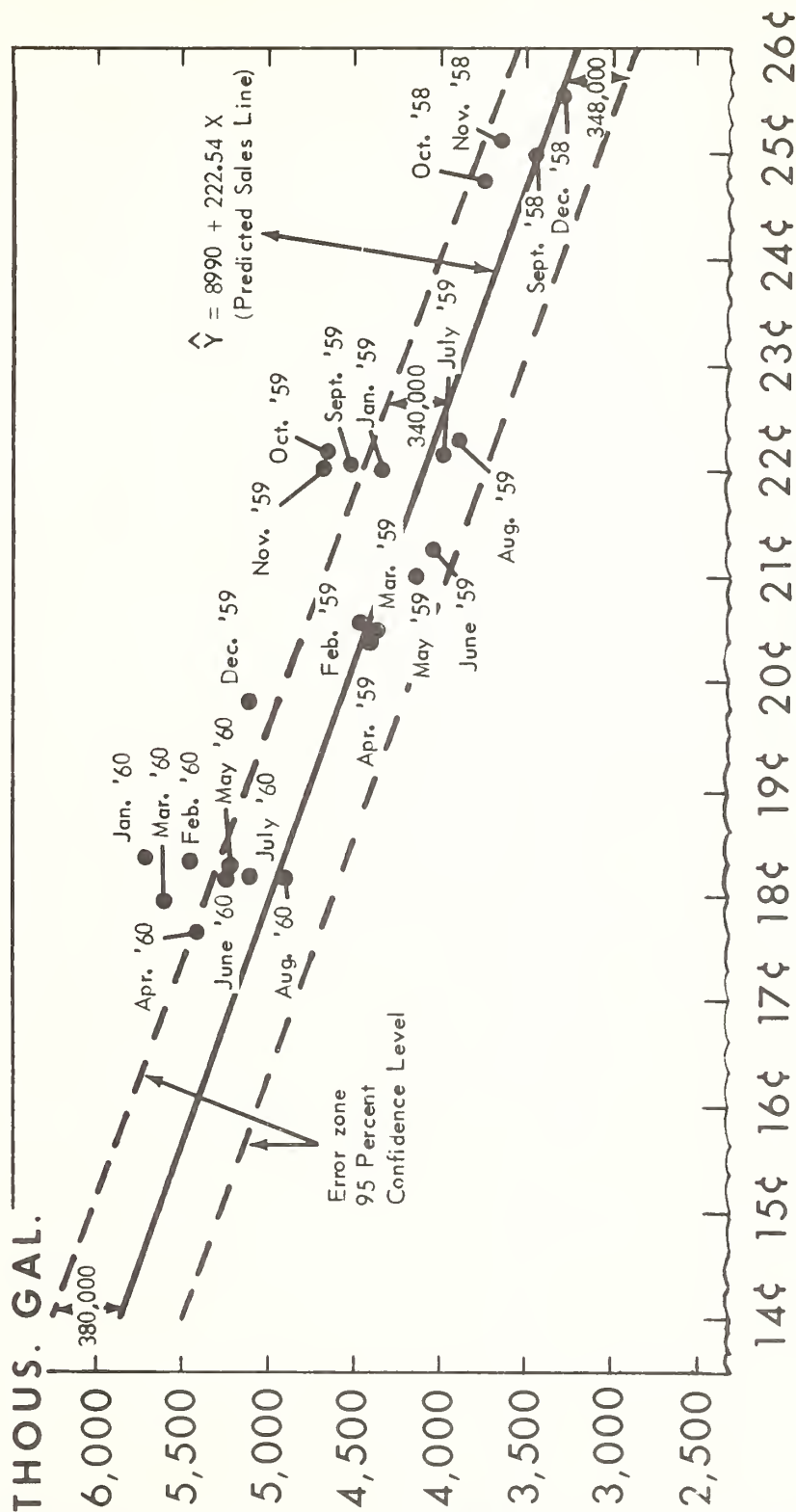
$$\text{4/ Coefficient of elasticity of demand} = \frac{q_1 - q_2}{q_1 + q_2} \cdot \frac{p_1 - p_2}{p_1 + p_2}$$

Where: q_1 = volume purchased prior to change in price
 p_1 = price before change
 q_2 = volume purchased after price change
 p_2 = price after change

$$\frac{4,050,000 - 4,975,000}{4,050,000 + 4,975,000} \div \frac{22.1 - 18.0}{22.1 + 18.0} = -1.002$$

OBSERVED AND PREDICTED SALES OF FROZEN ORANGE CONCENTRATE

For Sept. 1959-March 1960. Predictions Based on
Sept. 1956-Aug. 1959 Relationship, Sales to Prices



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Figure 2

without promotion, after allowing for possible chance variation in sales. Sales for April through August 1960, however, were at the sales level expected without promotion, after allowance for chance variation. Monthly sales for the year before the promotion were all very close to expected sales at the prevailing prices.

Therefore, it was concluded that a statistically significant increase occurred in sales of frozen orange concentrate during the promotion and the months immediately following it. It was further concluded that the increase in demand was associated with the promotional campaign of September-November, as there were no significant changes in other factors which would affect sales, such as per capita income, employment, and total population. However, the Florida Citrus Commission did follow a different schedule with its media advertising in 1959-60 than in 1958-59. Its media expenditures were less during the promotion period and greater during the postpromotion months.

The coefficient of elasticity of demand with respect to price for frozen concentrated orange juice during the period September 1959 through March 1960 was -1.0, the same as before the promotional period. ^{5/} Thus, the sales response to changes in price remained essentially the same as before the promotion, but on a higher level.

The decline in the sales level which began in April and continued through August 1960 indicates that the residual beneficial effects of the promotion program were disappearing. ^{6/} Figure 3 shows the differences between actual price per 6-ounce can and the estimated price required to move the volume sold each month without promotion. The difference between actual price and estimated price was within the range of chance variation from April through August 1960. However, the April price was near the extreme of the range and the subsequent decline was almost constant, which indicates a gradual return of the sales-to-price relationship to the prepromotion level.

To aid in explaining the source of the changes in purchase levels, special analyses of purchases by buyers classified as new, light, medium, and heavy were obtained under contract from the Market Research Corporation of America, covering periods before, during, and after the special promotion. These analyses included determination of changes in buying patterns and in volumes purchased by the various buyers in the four classifications between the prepromotion, promotion, and postpromotion periods. An analysis of the volume of purchases made by users of 12-cent coupons during the 3-month promotion period also was obtained.

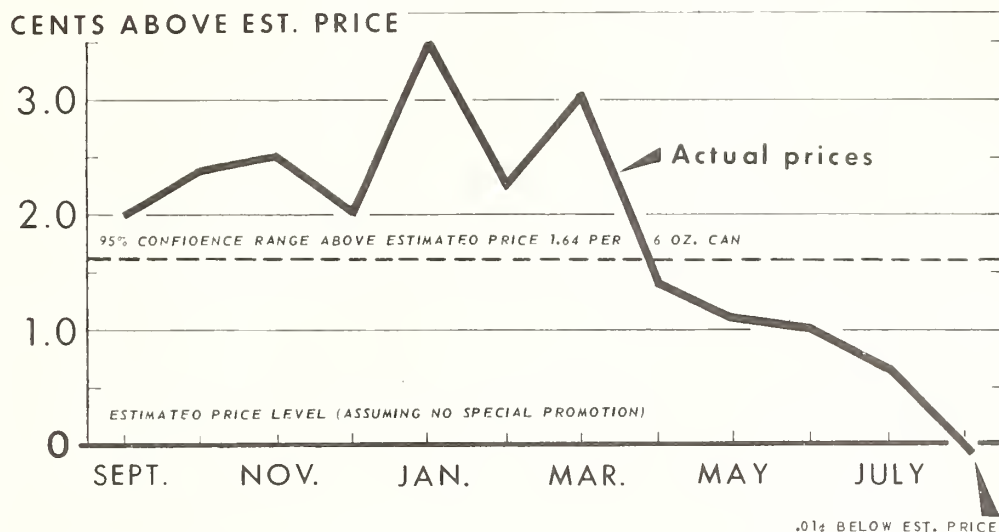
During the promotion (September-November), the number of families classified as new or occasional buyers was over one-half million greater than normal for a comparable period of time. This number represented an 11.6 percent

$$\frac{5/}{4,550,000+5,600,000} \cdot \frac{22.1-18.0}{22.1+18.0} = -1.01$$

^{6/} This decline in the sales response to advertising and promotional effort is referred to as the "decay curve" by F. V. Waugh, of the U. S. Department of Agriculture, in a paper presented to the Farm Foundation Workshop on Farm Functions, Chicago, Ill., June 20-22, 1960. The paper is entitled, "Prospective Uses of Estimated Coefficients and Related Statistics."

DIFFERENCE BETWEEN ACTUAL AND ESTIMATED PRICES FOR FROZEN ORANGE CONCENTRATE

Monthly Averages Per 6-oz. Can, Sept. 1959-Aug. 1960



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Figure 3

increase in the number of new or occasional buyers (table 1). In addition, the volume purchased by this group of buyers increased 40 percent. Thus, a greater number of buyers in this group were induced to purchase frozen concentrate than normal, and these buyers also purchased at a higher rate than usual.

Not only were a greater number of new buyers attracted during the September-November 1959 promotion period, but a higher than normal percentage of the buying families from previous periods continued to purchase frozen concentrate (table 1).

Significant shifts in the number of families falling into the light, medium, and heavy buyer classifications occurred during the promotion months. The number of light buyers declined 16 percent, while medium and heavy buyers increased 9 and 30 percent, respectively (table 2). As a result of these shifts, the average volume of frozen orange concentrate purchased per family during the promotion period increased from 84.2 ounces to 92.9 ounces, or 10 percent (table 2).

Approximately 10 percent of the families buying the concentrate during the promotion period (September-November) used one or more 12-cent coupons in making purchases. ^{7/} However, the volume of purchases represented by the use of coupons was only 4.4 percent of the total quantity purchased during this period (table 3). A further analysis of coupon purchases showed that 30 percent of

^{7/} Comparable data are not available on use of the 20-cent coupons; however, the total number of 20-cent coupons redeemed was insignificant relative to the 12-cent coupon.

Table 1.--Comparison of number of families buying frozen orange concentrate who were retained and lost from preceding 3-month period, and number of occasional buyers attracted during June-August and September-November 1959

Period	Buying families during preceding 3 months					New buyers during period	Total buyers during period ^{2/}
	Total ^{1/}	Retained	Lost				
	<u>1,000 families</u>	<u>1,000 families</u>	<u>Pct.</u>	<u>1,000 families</u>	<u>Pct.</u>	<u>1,000 families</u>	<u>1,000 families</u>
June-August.....	19,820	14,690	74.1	5,130	25.9	4,960	19,650
September-November:	19,936	14,923	74.9	5,013	25.1	5,535	20,458
Change (No.).....	116	233	.8	-117	-.8	575	808
Change (Pct.).....	.6	1.6	----	-2.3	----	11.6	4.1

^{1/} Includes new families coming into panel during previous periods (March-May and June-August).

^{2/} Does not include new families coming into panel during June-August period or September-November period.

Table 2.--Comparison of number of families purchasing frozen concentrated orange juice and volume purchased per family classified by light, medium, and heavy volume buyers during June-August and September-November 1959 ^{1/}

Period	Number of buying families				Average purchases per family			
	Light	Medium	Heavy	Total	Light	Medium	Heavy	All families
	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>	<u>oz.</u>	<u>oz.</u>	<u>oz.</u>	<u>oz.</u>
June-August.....	8,703	7,343	3,604	19,650	20.0	82.1	243.0	84.2
September-November:	7,786	7,996	4,676	20,458	20.9	80.0	235.0	92.9
Percent changes....	-10.5	8.9	29.7	4.1	4.5	-2.6	-3.3	10.3

^{1/} Buyers classified on basis of number of 6-oz. cans of frozen juice purchased during each period: Light, 1-6 cans (6-36 oz.); medium, 7-24 cans (42-144 oz.); heavy, 25 cans and over (150 oz. and over).

Table 3.--Comparison of number of families and volume of frozen concentrated orange juice purchases represented by use and nonuse of 12-cent coupons, September-November 1959

Classification of buying families	Number purchasing		Volume purchased	
	1,000 families	Percent	1,000 ounces	Percent
All families.....	20,458	100	1,901,283	100
Did not use 12-cent coupons:	18,352	89.7	1,817,839	95.6
Used 12-cent coupons.....	2,106	10.3	83,444	4.4

the coupon-using families redeemed two or more coupons and accounted for 57 per cent of the volume of the juice purchased with coupons (fig. 4). These findings on use of coupons are similar to those of a study on the use of coupons for butter and margarine in that a relatively small percentage of the buyers used coupons and the volume of purchases made with coupons was distributed disproportionately over the number of coupon users. 8/

Although the analysis of coupon use covered the September-November period only, it is reported that 12-cent coupons were redeemed through February. It was estimated as of April 1, 1960, 7 months after coupon distribution began, that 7.5 percent of the 12-cent coupons and 3.5 percent of the 20-cent coupons issued through all media had been redeemed. 9/

The dollar returns from promotion were estimated by comparing actual sales returns with the expected sales returns if price reductions had been employed instead of promotion to obtain an equal sales volume. Reduced prices appeared to be the most feasible alternative method available to obtain increased sales. Based on the relation of sales to average prices paid by consumers during the previous 3 years, an average price reduction at retail sufficient to accomplish the sales increase obtained during September-November was estimated to be 2 cents per 6-ounce can (fig. 3). Since the processors were the primary holders of stocks, it appears that they would have had to absorb this price reduction in the form of lower f.o.b. prices. The resulting reduction in revenue might have meant only reduction in profit; but in view of the relatively high prices of fruit during the 1958-59 season, losses were more probable. In either event, the difference between revenue at prevailing prices with promotion, and estimated returns for the same sales volume with the price reduced, in lieu of the promotional program, represents the probable comparative cost of moving the added volume of juice by the two methods.

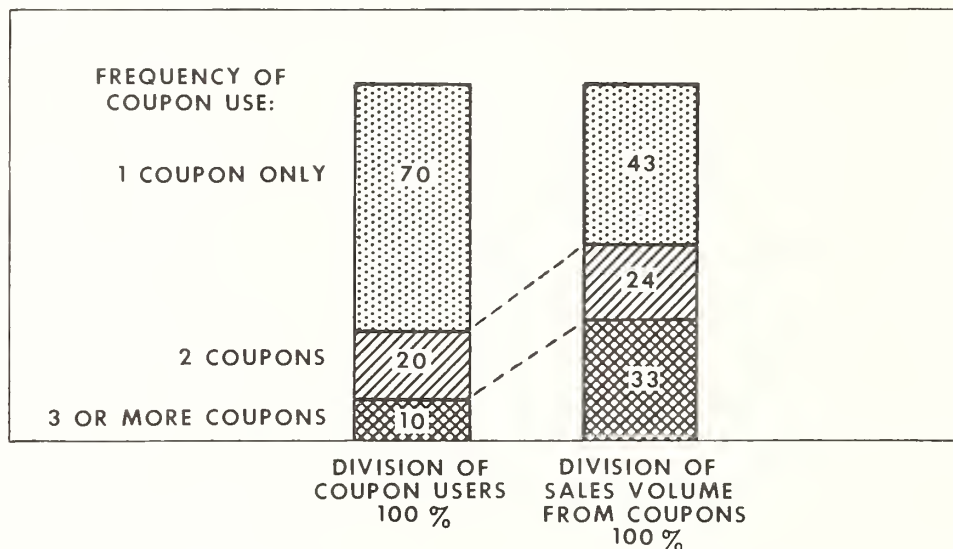
Assuming 2 cents per can as the price reduction necessary to accomplish the same sales volume that was obtained during September-November, the cost to the industry would have been \$5.8 million in the form of reduced revenue (table 4). In effect, this represents an estimated \$1.9 million (5.8-3.9) return to promotion during this period.

8/ Stockman, Lynn H., and Clement, Wendell E., "Effects of Coupons and Special Offers on Sales of Butter, Margarine, Shortening, Salad and Cooking Oils." Mktg. Res. Rept. No. 356.

9/ Estimates made by redemption agency.

USE OF COUPONS BY FAMILIES IN PURCHASING ORANGE CONCENTRATE

Distribution of Families Using and Volume Purchased, by Frequency of Use, Sept.-Nov. 1959



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Figure 4

In addition, the sales increase during the postpromotion months gave additional returns to the promotional effort. On the basis of the relationship of sales to prices during the 3 years prior to promotion, price reduction sufficient to have sold the same quantities would have cost the industry an additional \$12.5 million in the form of decreased revenues during the postpromotion period of December 1959 through March 1960 (table 4). In total, the losses avoided by the increased sales associated with the promotional campaign from September 1959 through March 1960 amounted to about \$18 million, or about 2.4 cents per can of concentrate sold during this period.

The total cost of the promotional program was approximately \$4 million; thus, the return from the program through March 1960 at the retail level is estimated at \$14 million. ^{10/} Part of this return appears to have been reflected in higher "on-tree" prices paid growers in the next crop year. ^{11/}

The special analysis of changes in purchase patterns of new, light, medium, and heavy buyers covering the postpromotion period (March-May) was not completed at the time this preliminary report was written. It will be in the final report.

^{10/} This analysis was based on the relationship of sales to the average retail prices paid by consumers, and thus these findings and estimates are not to be construed to mean that any segment of the trade fixed prices.

^{11/} Analysis of the effect of the promotion on the "seasonal average" on-tree prices received by growers will be included in a final report.

Table 4.--Comparison of retail price and value of frozen concentrated orange juice sold during a special promotion with estimated retail price and value in the absence of special promotion, September 1959 to March 1960

Periods compared	Observed with promotion			Estimated for the same			Excess of value with promotion
	Price 6-oz. can	Sales	Retail value	Price	Retail value	out promotion	
	<u>Cents</u>	<u>1,000 gallons</u>	<u>1,000 dollars</u>	<u>Cents</u>	<u>1,000 dollars</u>	<u>1,000 dollars</u>	
During promotion period.							
September.....	22.1	4,509	21,225	20.1	19,304	1,921	
October.....	22.2	4,560	21,562	20.2	19,620	1,942	
November.....	22.1	4,634	21,814	20.1	19,840	1,974	
Total during promotion period.....			64,601		58,764	5,837	
Postpromotion period:							
December.....	19.4	5,138	21,231	17.4	19,069	2,189	
January.....	18.2	5,730	22,213	16.0	19,555	2,658	
February.....	18.3	5,443	21,216	14.6	16,950	4,266	
March.....	18.1	5,579	21,509	15.3	18,207	3,302	
Total during post-promotion period.....			86,169		73,781	12,388	

